AMENDMENTS TO THE CLAIMS

Please add new claims 237-263. The following listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Original) A frit comprising:

a porous support structure having a plurality of void spaces; and

a plurality of secondary particles, wherein the void spaces are filled with the plurality of secondary particles such that the frit has a density of at least 50%, and wherein the secondary particles are dimensioned with respect to the void spaces for the frit to retain packing materials with diameters of less than about 2.5 microns.

2. (Original) The frit of claim 1, wherein the void spaces are partially filled with the secondary particles.

3. (Original) The frit of claim 1, wherein the void spaces are completely filled with the secondary particles.

4. (Original) The frit of claim 1, wherein the secondary particles form within the void spaces a secondary pore network having a pore size that is capable of retaining chromatographic packing materials with diameters of less than about 2.5 microns.

5. (Original) The frit of claim 1, wherein the frit is sintered after the void spaces are filled with the plurality of secondary particles.

6. (Original) The frit of claim 1, wherein the porous support structure is heated to immobilize the secondary particles that fill the void spaces.

7. (Original) The frit of claim 6, wherein the secondary particles are sintered to each other, to the porous support structure surrounding the void spaces, or both.

8. (Original) The frit of claim 1, wherein the porous support structure comprises a material selected from the group consisting of metals, metal alloys, metal oxides, ceramics, and polymers.

9. (Original) The frit of claim 1, wherein the porous support structure comprises a material selected from the group consisting of sinterable metals, sinterable metal alloys, sinterable metal oxides, sinterable ceramics, and sinterable polymers.

10. (Original) The frit of claim 1, wherein the porous support structure comprises a material selected from the group consisting of stainless steel, titanium, PEEK, polyethylene, Hastaloy™, polypropylene, Teflon™, glass, silica, titania, and zirconia.

11. (Original) The frit of claim 1, wherein the porous support structure comprises stainless steel.

12. – 38. (Cancelled)

39. (Original) A frit configured to be received in a tubular chamber, the frit comprising:
a porous support structure having a plurality of void spaces; and a plurality of secondary particles, wherein the void spaces are filled with the plurality of secondary particles so as to retain chromatographic packing materials, the secondary particles being dimensioned with respect to the void spaces and the packing materials such that the frit retains the packing materials with diameters of less than about 2.5 microns, wherein the frit is oriented with respect to a flow direction through the tubular chamber.

40. (Original) A frit comprising:

a porous support structure having a plurality of void spaces; and a plurality of secondary particles, wherein the void spaces are filled with the plurality of secondary particles to a depth of greater than about 10 microns, and wherein the secondary particles are dimensioned with respect to the void spaces such that the frit retains packing materials with diameters of less than about 2.5 microns.

41. (Cancelled)

42. (Original) A chromatography column, comprising:

a tubular chamber having first and second ends, the tubular chamber being filled with a chromatographic packing material; and at least one frit received in the first or second ends, the frit having:

a porous support structure having a plurality of void spaces, and a plurality of secondary particles, wherein the void spaces are filled with the plurality of secondary particles, and wherein the secondary particles are dimensioned with respect to the void spaces such that the frit retains the chromatographic packing material with particle diameters of less than about 2.5 microns.

43. – 85. (Cancelled)

86. (Original) A chromatography column comprising:

a porous support structure having a plurality of void spaces;

a plurality of secondary particles, wherein the void spaces are filled with the plurality of secondary particles so as to retain chromatographic packing materials, the secondary particles being dimensioned with respect to the void spaces and the packing materials such that the frit retains the packing materials with diameters of less than about 2.5 microns; and

a tubular chamber for receiving the frit, the frit being oriented with respect to a flow direction through the tubular chamber.

87. (Original) A method of preparing a frit for use in a high pressure liquid chromatography column, comprising the steps of:

providing a porous support structure having a plurality of void spaces; and filling the void spaces with secondary particles, wherein the secondary particles are dimensioned with respect to the void spaces such that the frit retains chromatographic packing materials with particle diameters of less than about 2.5 microns.

88. – 117. (Cancelled)

118. (Original) A method of preparing a frit for use in a high pressure liquid chromatography column, comprising the steps of:

providing a porous support structure having a plurality of void spaces; filling the void spaces with secondary particles; and orienting the porous support structure filled with the secondary particles such that the secondary particles remain immobilized in the void spaces during use, wherein the secondary particles are dimensioned with respect to the void spaces such that the frit retains chromatographic packing materials with particle diameters of less than about 2.5 microns.

119. – 147. (Cancelled)

148. (Original) A chromatographic system for separating and quantifying solutes in a liquid stream, comprising: a tubular chamber having first and second ends, the tubular chamber being filled with chromatographic packing materials; at least one frit received in the first and second ends of the tubular chamber, the frit having a porous support structure having a plurality of void spaces, and a plurality of secondary particles, wherein the void spaces are filled with the plurality of secondary particles, and wherein the secondary particles are dimensioned with respect to the void spaces such that the frit retains chromatographic packing materials with particle diameters of less than about 2.5 microns; a pump for propelling the liquid stream through the tubular chamber, the liquid stream contacting the chromatographic packing materials in the tubular chamber;

an injector for delivery of a sample into the liquid stream; and

a detector for detecting individual components of the liquid stream as the liquid stream exits the second end of the tubular chamber.

149. – 180. (Cancelled)

181. (Previously Presented) A method for separating and quantifying solutes in a liquid stream, comprising the steps of:

providing a tubular chamber having first and second ends, the tubular chamber being filled with chromatographic packing materials; inserting at least one frit in the inlet and outlet fittings, the frit having: a porous support structure having a plurality of void spaces, a plurality of secondary particles, wherein the void spaces are filled with the plurality of secondary particles, and wherein the secondary particles are dimensioned with respect to the void spaces such that the frit retains chromatographic packing materials with particle diameters of less than about 2.5 microns;

propelling the liquid stream through the tubular chamber, the liquid stream contacting the chromatographic packing materials in the tubular chamber;
injecting a sample into the liquid stream; and

detecting individual components in the liquid stream as the liquid stream exits the second end of the tubular chamber.

182. – 211. (Cancelled)

212. (Original) A kit for use with a high pressure liquid chromatography column, the column having a chamber with first and second ends, comprising:

a fitting for threaded attachment to one of the first and second ends of the chamber; at least one frit received in the fitting, the frit having:

a porous support structure having a plurality of void spaces, and

a plurality of secondary particles, wherein the void spaces are filled with the plurality of secondary particles, and wherein the secondary particles are dimensioned with respect to the void spaces such that the frit retains chromatographic packing materials with particle diameters of less than about 2.5 microns; and

instructions for use.

213. – 236. (Cancelled)

237. (New) The frit of claim 1, wherein the porous support structure comprises 316 stainless steel.

238. (New) The frit of claim 1, wherein the porous support structure has a media grade ranging from about 0.5 to about 10.

239. (New) The frit of claim 1, wherein the porous support structure is 0.5 media grade sintered stainless steel.

240. (New) The frit of claim 1, wherein the porous support structure is 2.0 media grade sintered stainless steel.

241. (New) The frit of claim 1, wherein the secondary particles are about 5 microns in diameter or smaller.

242. (New) The frit of claim 1, wherein the secondary particles range from about 3 microns to about 5 microns in diameter.

243. (New) The frit of claim 1, wherein the secondary particles are about 3.5 microns in diameter.

244. (New) The frit of claim 243, wherein the secondary particles are about 4 microns in diameter.

245. (New) The frit of claim 1, wherein the porous support structure is 0.5 media grade sintered stainless steel, and the secondary particles are about 4 microns in diameter.

246. (New) The frit of claim 1, wherein the porous support structure is 2.0 media grade sintered stainless steel, and the secondary particles are about 4 microns in diameter.

247. (New) The frit of claim 1, wherein the secondary particles have the same composition as the packing materials retained by the frit.

248. (New) The frit of claim 1, wherein the secondary particles have a different composition than the packing materials retained by the frit.

249. (New) The frit of claim 1, wherein the secondary particles have the same composition as the porous support structure.

250. (New) The frit of claim 1, wherein the secondary particles have a different composition than the porous support structure.

251. (New) The frit of claim 1, wherein the secondary particles are spherical stainless steel particles.

252. (New) The frit of claim 1, wherein the packing materials retained by the frit are chromatographic packing materials.

253. (New) The frit of claim 252, wherein the chromatographic packing materials are selected from the group consisting of silica gel, derivatized silica gel, zirconia, derivatized zirconia, titanium oxide, derivatized titanium oxide, organo-silica hybrids, derivatized organo-silica hybrids, hybrids of metal oxides, and derivatized hybrids of metal oxides.

254. (New) The frit of claim 1 for use in a chromatography column.

255. (New) The frit of claim 254, wherein the chromatography column is a high pressure liquid chromatography (HPLC) column.

256. (New) The frit of claim 255, wherein the chromatography column is a high pressure liquid chromatography column packed with chromatographic packing materials with particle diameters of less than about 2.5 microns.

257. (New) The frit of claim 1, wherein the secondary particles fill the void spaces of the porous support structure to a depth of greater than about 10 microns.

258. (New) The frit of claim 1, wherein the frit is oriented with respect to a flow direction through a tubular chamber.

259. (New) The frit of claim 1, further including a tubular chamber for receiving the frit, the frit being oriented with respect to a flow direction through the tubular chamber.

260. (New) The frit of claim 1, wherein the frit is configured as an in-line filter for use in a chromatography system.

261. (New) The frit of claim 260, wherein the frit is arranged upstream of a column in the chromatography system.

262. (New) The frit of claim 260, wherein the frit is arranged between a pump and an injector in the chromatography system.

263. (New) The frit of claim 260, wherein the frit is arranged between an injector and a column in the chromatography system.